Implementing Aboriginal content in the science program: A case study

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ABSTRACT

The study reported in this article describes how one teacher was able to modify his science program to include Aboriginal content. The interesting outcomes discussed should provide teachers with some encouragement to engage in action research to develop their own 'Aboriginal science' courses.

INTRODUCTION

Growing support for the inclusion of Aboriginal content in school science programs in recent years (Bindon, 1988; Ritchie, 1988; Scott, 1986; Young, 1987) has led to classroom, school and system level curriculum development initiatives (ACT Schools Authority, 1986; Needham, 1989; Ritchie & Butler, 1990). While state and national developments should be encouraged, classroom teachers can learn much from their colleagues' experiences of developing and implementing science materials and activities which include an Aboriginal perspective. This study provides an account of a teacher's experiences with the implementation of Aboriginal content in his Year 8 science program.

SETTING

The study was conducted in a large state secondary school from the 'working class' city of Ipswich, about 45 kilometres west of Brisbane. Because of its relatively high proportion of Aboriginal students, the school has been able to attract funding for the employment of an Aboriginal counsellor, and to implement a number of other initiatives to assist these students. There were three Aboriginal male students (Samuel, Andrew, Eddie) in the (27 student strong) Year 8 class studied.

PURPOSE

The teacher's goal was to include topics and activities which would be perceived to be more relevant or meaningful by his Aboriginal students, without omitting the range of basic concepts specified in the Year 8 science program. A weekly excursion to a nearby location was planned as the central stimulus for discussions and follow-up classroom activities. Two units designed in this way were taught over a four-week period. Unit 1 was named 'Animals and Plants at Work', Unit 2 was named 'The Rock Cycle'; both units corresponded with assigned chapters from the prescribed text (Stannard & Williamson, 1985).

METHOD

Action research has been defined as:

> ... a form of collective self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own social or educational practices, as well as their understanding of these practices and the situations in which these practices are carried out.
>
> (Kemmis & McTaggert, 1988, p. 5)

The essential feature of this appoach to research is that ideas are tried out in practice 'as a means of improvement and as a means of increasing knowledge about the curriculum, teaching, and learning ' (Kemmis & McTaggert, 1988, p. 6).

The authors, a teacher and teacher educator, worked collaboratively throughout this action research study (c.f., Baird, Mitchell & Northfield, 1987). Data were collected from a variety of sources using several techniques. The research facilitator (Ritchie) made video recordings of excursions and selected classroom activities. At the end of each observed session significant events were identified and possible actions for subsequent lessons were discussed. After these sessions, and in private, the teacher (Kane) reviewed the video tapes and reflected upon earlier discussions. Other adults (e.g. the Laboratory Assistant and Resource Teacher) were involved during some excursions and informal observations and comments were welcomed. The teacher compiled a diary of events, including perceived reactions of the participants to the implemented activities and reflections on his practice, throughout the study. Finally, the research facilitator interviewed selected students both during and at the end of the study. Data from all sources are presented in the results and discussion of outcomes which follow.

RESULTS

The lagoon study

The first unit of 'Animals and Plants at Work' was linked to the previous topic of human digestion by discussing the foods that other animals ate. This led the teacher to ask students to predict food sources likely to be found at the lagoon - the site of the first excursion. The classroom conversation turned to water lilies as food consumed by Aborigines, and the large number of Aborigines who once supported themselves from this and other lagoons and swamps in the area. As the discussion progressed, the Aboriginal students became more willing to volunteer information. After class time they also initiated a number of informal conversations with the teacher on matters relating to family experiences and knowledge of natural foods consumed by their traditional ancestors. Preparations for the impending excursion (i.e., formation of groups, selection of project topics, and discussion of safety issues) also were made.

At the lagoon, the group of three Aboriginal students and one non-Aboriginal boy worked impressively. Samuel kept trying to quieten the other students so that the birds would not be disturbed. Samuel and Andrew were keen to articulate procedures for collecting witchetty grubs and locating better spots to catch yabbies, and suggestions to improve the location of their bird hide.

The teacher's diary revealed that although he was personally disappointed at his plans for student discoveries, all was not lost:

> ... on looking at the video of the day, I realised that many of the process and affective aims were achieved. The Aboriginal group spent quite some time observing moor hens and ducks... One boy found a half-eaten duckling, and his group's discussions of what had killed it did more for understanding of the lagoon-web than anything I had prepared.

Back in the classroom, the students were asked to complete their worksheets and data from the groups were exchanged to ensure a relatively common starting point for their reports - the intended student project for the unit. Although two groups were able to present their reports to the class on time, most groups needed more time to finalise their work.

The study of the local geology

The connecting thread between the geology unit and the lagoon study was the presence of Aboriginal stone implements or stone flakes found at ancient camp sites around the lagoon area. The key concept was hardness - the hardness of rocks required for tools.

Before the geology excursions, a classroom lesson focussing on the hardness of local rocks and their suitability for use as Aboriginal tools was conducted. Various samples of Aboriginal tools were distributed to the students for the purpose of stimulating discussion. Preparations for the excursions, especially safety aspects (e.g., the need to wear goggles when using a geological hammer), also were emphasised in this lesson.

During the first excursion, one group of girls found some sandstone that was heavily impregnated with iron oxide, and asked if this was the ochre that Aborigines used for paint. To confirm its value as paint they were encouraged to paint pictures on the back of their worksheets, on rocks and on bark flaked off trees. The Aboriginal boys returned to base proudly showing students and staff the berries they had gathered, which they suspected would have been valued by traditional Aborigines. Soon after, Andrew demonstrated how he thought axes were once made by using a vine to tie a lump of shale to a branch. Like other students, this group realised, for themselves, that shale was too soft and quite unsuitable for the job.

At the other locations, the students were able to determine that broken pieces of conglomerate,

limestone and silcrete (limestone replaced by silica) were more suitable than shale for tools. In subsequent lessons, the students were required to finalise their group reports and presentations.

DISCUSSION OF OUTCOMES

The most disappointing aspect of the project was that very few groups were able to finish their reports. More class and library time was needed. Apart from allocating more time for groups to complete their reports, setting the task of displaying their work in the library might have provided an additional incentive for students to produce quality work in the time available.

Nevertheless several positive outcomes emerged from the study. Each is briefly discussed below.

Interest in science

The Aboriginal students experienced science lessons (perhaps for the first time) which focussed on concepts related to their heritage. They appeared interested in what they were learning and became progressively more involved in the activities. During his interview, for example, Sam commented:

> I wasn't really interested in fossils before. Now I'm starting to collect them... Before, I thought that science was only about acids and that... but now I am really interested... I found out that it's about animals and culture and that... how Aborigines used the world around them.

This reaction is not surprising because Sherwood and Jackson (1982, p. 234) have argued that, in programs which feature Aboriginal content, 'Aboriginal children will for the first time feel `at home' in the curriculum and in the whole experience of schooling as much as Anglo-Australian children already do.'

The non-Aboriginal students also developed an interest in the Aboriginal aspects of the ecology and geology topics studied. These students frequently used words such as 'fun' when describing the activities. For example, when one student was asked about what she had done in a geology lesson she replied: 'I learnt about the rocks that Aboriginals [sic] made knives out of - it is too much fun to explain.'

Appreciation of Aboriginal culture

The teacher reported that not only had many of the non-Aboriginal students shown interest in the Aboriginal content, but also they had developed a favourable impression of the skills of the traditional Aborigines. One of the non-Aboriginal girls interviewed commented: 'I learnt that they [Aborigines] were pretty smart people... the sort of things [like axes] that they used to think up'. This sort of reaction has been reported previously (Ritchie & Butler, 1990), thus adding weight to the claim that Aboriginal content can help students to appreciate the diversity of practices and lifestyles of the original Australians (Scott, 1986).

Teacher student relations

During the course of the study the relationships between each of the Aboriginal students and the teacher improved. Andrew admitted that he 'felt good' when his teacher engaged him in conversation relating to his knowledge about Aboriginal culture. As well the teacher acknowledged that he had gained insight and understanding from these interchanges. Additional evidence supporting the assertion that student-teacher relations became more positive was obtained from the student interviews. Once again, Sam's comments best represent the views expressed by the Aboriginal boys: 'At first he [teacher] used to get up me but now I'm starting to settle down because it's got me interested... because I've been listening a lot and not mucking around and that'. Perhaps the most telling evidence of better relations between the teacher and the Aboriginal students came from the teacher's diary:

> My seven year old daughter remarked that as we drive around, 'the Aborigines sure like waving to you now, don't they!'
>
> ... At the local shop, an Aboriginal boy approached me to introduce himself, as cousin of Eddie (the quiet Aboriginal boy in my class).

On the basis of these observations, confidence in Watts' (1981) claim that Aboriginal content will increase the perceived relevance of the subject for Aboriginal students is strengthened.

CONCLUSION

The outcomes of this study, hopefully, will provide science teachers with the incentive not only to develop their own Aboriginal science programs, but also to engage in action research. Only through continued classroom-based research can the inclusion of Aboriginal content in the curriculum be implemented more effectively and, as a consequence, improve the quality of education of all Australians.

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